

temperature for 1.5 hours. After cooling the solution, it was washed with two 200 ml portions of a 10 % sodium bicarbonate solution in water, followed by a 200 ml wash with water. The organic layer was dried with MgSO₄ to yield a light yellow liquid having an SH content of less than 0.5% as determined by titration with a 0.100 N iodine solution in isopropanol. The ¹H-NMR (CDCl₃, δ) spectrum was: 2.3 (2H, t, -C(=O)-CH₂-CH₂), 2.8 (2H, m, -S-CH₂-CH₂-), 4.2 (2H, m, -S-CH₂CH₂-O-), 4.9 (1H, m, -O-CH(-S-CH₂-)-CH₂-CH₂-). The total color change (dE) of a PVC composition containing 0.13 phr of the latent mercaptan of this example was measured versus a white tile standard using a Hunter colorimeter at one minute intervals. At one minute, it was 4.2; at five minutes, it was 8.4.

REFERENCE EXAMPLE 2

2-S-(tetrahydropyranyl)-(2-ethylhexyl)thioglycolate is prepared by adding 172.45 grams (2.05 equiv.) of 3,4-dihydro(2H)pyran dropwise to 472 grams (2.00 equiv.) of 2-ethylhexyl thioglycolate containing 0.9 gram of methanesulfonic acid (70% active) over a period of 45 minutes under a nitrogen blanket and a temperature between 25-35 C and heating to 35-40 C for 2 hours. The reaction mixture is cooled before being vacuum filtered through carbon black to yield the desired product.

The Preparation of Stabilizer Compositions of this Invention

EXAMPLES 1-4 and CONTROLS

Rigid PVC compositions containing:

| <u>INGREDIENT</u> | <u>AMOUNT</u> |
|---------------------------------------------------------|---------------|
| PVC resin GEON 103-EP | 100.0 |
| Calcium carbonate | 5.0 |
| XL-165 | 1.1 |
| Calcium stearate | 0.4 |
| Oxidized polyethylene | 0.15 |
| 2-S-(tetrahydropyranyl)- (2-ethylhexyl)thioglycolate | 0.5 |

and the amounts of zinc chloride (as a 50% solution in water) and zinc stearate indicated in Table 1 to give a constant level of zinc ion (about 0.02 phr) were processed on a standard horizontal two-roll mill (roll speeds 30F/40R) at 380°F with chips taken at one minute intervals to a maximum of 12 minutes. The amount of zinc ion contributed by each of the zinc salts is also shown in Table I. The color properties of the chips were measured using a Hunter Labs Colorimeter (L, a, b) and the yellowness index was selected as the measurement for comparison in Table II.

TABLE I

| <u>Example</u> | <u>Zinc salt</u> | <u>Amount (phr)</u> | <u>% Zn Cntrbn</u> |
|----------------|------------------|---------------------|--------------------|
| Control A | Zinc stearate | 0.230 | 100 |
| 1. | Zinc stearate | 0.184 | 70 |
| | Zinc chloride | 0.020 | 30 |
| 2. | Zinc stearate | 0.138 | 55 |
| | Zinc chloride | 0.040 | 45 |
| 3. | Zinc stearate | 0.092 | 35 |
| | Zinc chloride | 0.060 | 65 |
| 4. | Zinc stearate | 0.046 | 17 |
| | Zinc chloride | 0.080 | 83 |
| Control B | Zinc chloride | 0.100 | 100 |

TABLE II

PVC Color Hold (Yellowness Index)

| Ex. | Time/Minutes | | | | | | | | | | | |
|-----------|--------------|------|------|------|------|------|------|------|------|------|------|------|
| Control A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | 26.1 | 62.4 | 74.7 | 81.5 | 76.9 | 70.5 | 62.8 | 50.9 | 46.4 | 50.3 | 62.4 | 76.8 |
| 2 | 16.2 | 28.0 | 40.4 | 46.4 | 47.3 | 43.8 | 40.0 | 37.2 | 40.1 | 51.4 | 67.1 | 83.1 |
| 3 | 14.9 | 17.2 | 21.4 | 24.3 | 26.7 | 26.6 | 30.2 | 35.8 | 48.3 | 61.8 | 83.6 | 96.1 |
| 4 | 13.0 | 14.3 | 15.4 | 17.2 | 19.3 | 23.9 | 32.0 | 44.5 | 64.4 | 86.6 | 96.3 | 91.7 |
| 5 | 13.0 | 14.4 | 15.4 | 18.0 | 23.7 | 33.5 | 49.6 | 71.3 | 90.9 | 98.3 | 98.1 | --- |
| Control B | 13.3 | 13.9 | 15.0 | 18.1 | 25.2 | 38.9 | 55.9 | 77.5 | 93.5 | 96.3 | 98.5 | --- |

Articles of manufacture contemplated by this invention, e.g. packaging film, tubing, rigid pipe, and window profile, are formed from the stabilized compositions of this invention by any of the well-known conventional techniques for forming polymers into shaped articles.

While a few specific embodiments of this invention have been disclosed in considerable detail, variations and modifications of these embodiments can be effected without departing from the spirit and scope of the invention as disclosed and claimed herein.